

This variety is not noticed by Agardh in his 'Synopsis Algarum Scandinaviæ,' p. 13, where he describes the frond as "e fibris spiritaliter tortis constructæ," nor in his 'Species Algarum,' p. 161, nor in any other work I have at hand.

Swanage, Sept. 1858.

On the Influence of the Moon's Light upon Plants.

By Prof. ZANTEDESCHI.

The Abbé Tessier having made a great number of experiments upon etiolated plants, which had become white or yellow from being kept in the dark, observed that those exposed to the light of the moon, and kept in the dark during the day, were evidently less yellow or white than those kept in the dark day and night. (Acad. des Sc. de Paris, 1781; Bertholin, 1783; Giuseppe Toaldo, Vincenzo Padova, 1797.)

The Abbé Antonio-Maria Vassalli, Professor of Physics at Turin, relates that the Sensitive-plant is susceptible of the influence of moonlight. "Having," he says, "procured some sprouted seeds of the Sensitive-plant, twelve days after their germination I transplanted them into earth contained in glass bottles, and into other vessels filled with earth.

"I observed that their sleep had a regular periodicity. Exposed to the east two hours before sunrise, their leaves, which were perfectly closed at 1 A.M., began to open at dawn, and unfolded completely some little time after sunrise, more or less quickly according to the state of the air. If they are carried during the day into a dark place, or covered with an opaque vessel, the leaves close, but not so exactly as during the night. Exposed afresh to the light, they open again slowly. In making these observations I was careful to shake all the pots equally, without covering them, in carrying them, in order that the variations might not be attributed to these shocks. After repeating the various observations, for greater certainty, I exposed the pots to the light of the moon.

"I did not remark any variation in the leaves when the exposure, commencing at 1 A.M., had lasted one hour; but after three hours the leaves were less closed, though still not open.

"Having one evening exposed the pots to the rays of the moon until midnight, when the leaves were not completely closed, I found them very well opened about 1 A.M.

"I attempted to arrange a lens so that its focus should fall on a closed leaf; but I could not detect any variation in the short space of time during which the light of the moon was condensed." (Opuscoli scelti di Milano, 1794.)

These observations have been renewed in our own time on vetches, by Prof. G. Giulj: he caused vetches to germinate and spring up in a cellar entirely shut up from the light both of the sun and moon; and the little plants were very white. Some of them were exposed for several nights to the action of the moon's rays, while others, also in full growth, were kept in complete darkness: the former acquired a

green colour like that of the same plants exposed in the open air, and even to the sunlight; those, on the contrary, kept constantly protected from the light of the sun and moon were not at all coloured, and ultimately rotted. More than this: Prof. Giulj ascertained by direct experiment that the light of the moon falling upon certain plants, or certain leaves, has the property of causing the liberation of oxygen (*Dei Lavori della Reale Accadem. delle Scienze, 1844*).

I have successfully repeated the experiments of Tessier and Giulj on the power possessed by the rays of the moon in developing the colours of the leaves of plants, and I took the greatest precautions to maintain the pots in all the conditions which were necessary to avoid the objections which might be founded upon the influence of humidity or any other atmospheric variation. They were kept in the dark during the whole day; when the days preceding the full moon arrived, they were carried, after 3 A.M., always to the same place to be exposed to its rays: but two of the pots were uncovered, and two protected from the rays by an opaque body; the others were freely exposed to the open air and all its influence.

After six nights' exposure, the difference in the coloration was very marked: the little plants constantly protected from the influence of light were white; and those exposed to the lunar rays had a yellowish tint, which appeared to be changing to the green colour.

I desired to repeat also the experiment of Vassalli. I have only made observations upon leaves perfectly closed, and little shoots, of no vigour, drooping over the edges of the pots wherein they had germinated. After that, I tried exposing various specimens of *Mimosa pudica* to the action of the moon's rays for an hour during full moon. I was delighted to see the little shoots rise after a quarter of an hour's exposure; the plants were at the distance of a few millimetres from the edge of the pot; in half an hour the stems were still straighter, and in an hour and a half they had attained the height of more than 2 inches; but I could not detect any sensible opening of the leaves. This experiment appeared necessary in order to confirm what has been said of the influence of the rays of the moon upon the growth of the *Mimosa*, because this fact, more or less established by Vassalli, has not been received with entire confidence by other authors; and in this last experiment I took the precaution of placing near the *Mimosa* exposed to the lunar rays another of the same plants covered with an opaque body, which shielded it from the light: in this no movement was produced. The experiment was repeated six times with constant results. We may therefore believe that the growth of the little stems of the *Mimosa* is to be attributed solely to the influence of the moon's rays.

I made these experiments in the summer of 1847; and I have thought it necessary to enter into details, because I was able to make certain, by a great number of observations, frequently repeated, that the difference of temperature, of the movement of the air, and exposures to different degrees of light, had an influence upon the more or less prompt and more or less perfect manner in which the leaves of the *Mimosa* open and close.

One morning in the month of July, about 5 o'clock, in the Botanic Garden of Venice, two plants of *Mimosa pudica*, kept in a conservatory (perfectly expanded), presented an aspect of luxuriant vegetation. Another, exposed in the open air, had its leaves entirely closed and the stems bent. A fourth, placed in another part of the garden, was half-closed; and another, in a separate place, was quite closed. On the day preceding, the gardener had, at my orders, shut up the last in a dark place three hours before sunrise.

I took care also to verify the influence exerted upon the *Mimosa* by the artificial light of a lamp, and I found the growth was from 3 to 5 centimetres.—*La Lumière*, July 17, 1858.

General Examination of the Group Euphorbiaceæ.

By M. H. BAILLON.

The great number of facts met with in the study of about fifteen hundred species, cultivated at Paris or preserved in the collections, have compelled the author to divide into two series his 'Étude générale du groupe des Euphorbiacées.' In the first part he combines the matters relating to the search for types, the natural affinities, classification, descriptions of genera, and organography, based as far as possible upon organogenic studies.

It is only in the adult state that the existence of compound leaves can be regarded as exceptional in this order. Very frequently they are compound at their first appearance; but the terminal lobe only becomes developed, the lateral being abortive. They then become lamellæ of variable form, and very often true glands, which occupy the base of the blade. It is simply by such an arrest of development that a *Cremophyllum* differs from a *Dalechampia*; but the two genera cannot be otherwise separated. There are also often lobes of abortive leaves, destitute of parenchyma, and reduced to their nervures terminating in a glandular thickening, which have been regarded as branched hairs.

The structure of the male flower presents every possible modification, from the diplostemonous type of the andrœcium to the indefinite arrangement of a variable number of naked stamens. Consequently, the only fixed characters that can be resorted to in the Euphorbiaceæ lie in the female flower, and, in this, in the gynœcium.

Hence the extent of the researches relating to this organ. Its development has been followed in all the plants cultivated in the Paris gardens and hot-houses, from the appearance of the carpellary leaves upon a common, central, isolated axis, up to the time when the ovules developed higher up on the same axis have acquired their double integuments.

It is the outer integument that forms the caruncle of the Euphorbiaceæ, by a thickening of the exostome, and this in a constant manner. Its origin can no longer be attributed to the cellular cap which arises from the placenta and advances to meet the ovule. There is always a period when these two structures are completely independent, and their perfect contact takes place at the time when